Chaetanthera kalinae (Mutisieae, Asteraceae), a New Species from Chile

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Abstract. *Chaetanthera kalinae*, a new annual species of *Chaetanthera* Ruiz & Pavón, has been discovered from the Cordillera de Doña Ana and the Sierra de Tatul del Medio in Chile. This yellow-flowered, pseudorosette-forming species from the subgenus *Tylloma* is described, illustrated, and discussed in the context of the morphologically most similar taxa: *C. limbata* (yellow-flowered, lax annual) and *C. lanata* (white-flowered, pseudorosette-forming perennial; subgenus *Carmelita*).

Resumen. Se describe una nueva especie anual del género *Chaetanthera* Ruiz & Pavón, *C. kalinae*, de la Cordillera de Doña Ana y la Sierra de Tatul del Medio, Chile. Pertenece al subgénero *Tylloma*, es de hábito pseudo-arrosetado y con flores marginales amarillas. Se da una descripción con ilustraciones y se discuten aspectos de su morfología en el contexto de los taxones parecidos: *C. limbata* (planta anual de hábito flojo y flores amarillas) y *C. lanata* (planta perenne, pseudo-arrosetada y flores blancas; subgénero *Carmelita*).

Key words: *Chaetanthera*, Chile, Cordillera de Doña Ana, *Tylloma*.

The genus *Chaetanthera* Ruiz & Pavón (Asteraceae, Mutisieae) currently has 42 species distributed over Chile, Argentina, Peru, and Bolivia (Davies & Facher, 2001). The center of diversity of the genus lies in the high Andes of central Chile, which has a Mediterranean-type climate zone. While studying the genus for a forthcoming revision, material of a distinct new species was found mixed in with collections of *Chaetanthera glabrata* (DC.) F. Meigen and *Chaetanthera limbata* (D. Don) Lessing. Recent collections made by M. T. Kalin Arroyo (University of Chile, Santiago) and C. Ehrhart (Ludwig-Maximilians–Universität München, Germany) confirmed the status of the material as a hitherto undescribed species. The morphology and habit of this new species places it firmly in *Chaetanthera* subg. *Tylloma* D. Don. The taxa in the subgenus *Tylloma* represent one of the most interesting species associations in *Chaetanthera* and show fascinating distribution and speciation patterns, especially in the lowland, coastal taxa. In particular, the indumentum, leaf, and involucral bract morphology can appear very polymorphic. Taxonomically, the morphological variability in the subgenus *Tylloma* has been well documented, if perhaps not well understood (Reiche, 1905; Cabrera, 1937). However, *C. kalinae*, as a higher-altitude representative of this group, is remarkably consistent and stable in its characters. This is also true for the other high-altitude member of the subgenus, *C. splendens* (Remy) B. L. Robinson.

Chaetanthera kalinae A. M. R. Davies, sp. nov. TYPE: Chile. Región de Coquimbo, Prov. de Elqui: Straße von Vicuña zum Embalse La Laguna, 30°03′S, 70°05′W, 2340 m, 27 Nov. 2002, *C. Ehrhart 2002/061* (holotype, MSB; isotypes, CONC, K, MO). Figure 1.

Planta characteristica subgenerica *Tylloma*. Planta annua herbacea, ascendens vel decumbens, ad 8 cm alta, raro ramosa. Folia pseudopetiolata, lamina spathulata vel reniforme orbiculata, limbata marginibus integris, indistincte succulenta, atrogriseo-viridis, dense albo lanata. Capitula radiata foliis superioribus subrosulatis ornata. Involucri bracteae interiores oblanceolatae, obtusae et mucronatae, membranaceae, subglabrescentes, apices pallide rosaceae. Flores radii et flores disci corolla aurea. Pappi setae ad 10 mm longae, 1–2 seriatae, albidae, basalis longe ciliatae, apicalis abrupte scabridae. Achenia ad 3.5 mm longa, brunnescentia, laxe vel densa papillosa.

Annual monoecious *herbs* to 8 cm; *roots* filiform; *stems* creeping to ascending, decumbent; stems glabrous to sparsely pubescent with white, filiform hairs; stems often buried in substrate; flowering stems originate from a central node a short distance above roots, rarely branched. *Cauline leaves* few, alternate, forming clusters at nodes and distinct rosettes below capitula with subtle morphological transition to phyllaries surrounding capitula, when dried the leaves recurve strongly and at flowering cauline leaves usually die back; *leaves* 8–9(13) × 5–6.5 mm, pseudopetiolate, pseudopetioles 5–7 mm in length, margins of pseudopetioles rarely sparsely dotted with glandular trichomes; lamina spathulate to orbicular-reniform, apices obtuse to obcordate, mucronate, bases subcordate to rounded, lamina slightly succulent,

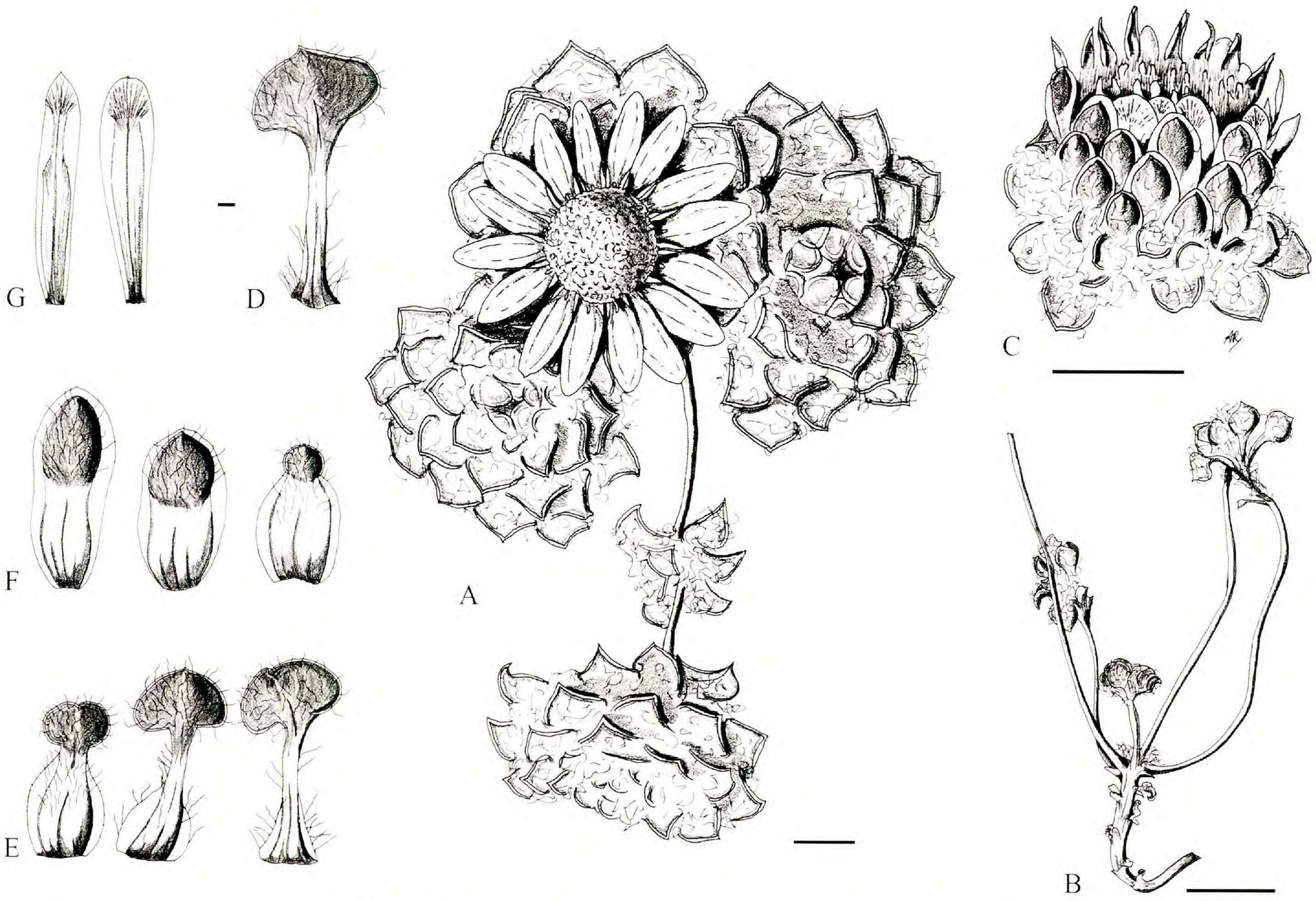

Figure 1. *Chaetanthera kalinae* A. M. R. Davies. —A. Habit, aerial view. —B. Habit, lateral view of lower stem region. —C. Capitulum detail. —D. Cauline leaf. —E. Outer involucral bracts (series progression from right to left). —F. Middle involucral bracts (series progression from right to left). —G. Inner involucral bracts (series progression from right to left). A, drawn from slide (*Ehrhart 96/1056*, MSB); B from *Wagenknecht 18117* (GH); C–G from the holotype *Ehrhart 2002/061* (MSB). Scales: A–C = 10 mm; D–G = 1 mm.

Table 1. Morphological characters defining *C. kalinae*, *C. limbata*, and *C. lanata*.

Character	*C. kalinae*	*C. limbata*	*C. lanata*
Ray color	white with red dorsal stripe	yellow	yellow
Habit	perennial, lax cushion, lignified roots	annual, decumbent, filiform roots, leaves form pseudorosette below capitula	annual, decumbent, filiform roots, leaves form pseudorosette below capitula
Leaf indumentum	densely lanate abaxially and adaxially; black glandular trichomes rare and sparse on lamina margins only	mostly glabrous but villous in leaf axils (on surfaces when young); black sessile to pedicellate glandular trichomes on lamina and margins	densely lanate abaxially and adaxially; black glandular trichomes rare and sparse on lamina margins only
Leaf lamina	orbicular-reniform, bases subcordate to rounded	spathulate orbicular to elongate-cordate, bases rounded to attenuate	spathulate orbicular-reniform, bases subcordate to rounded
Inner involucral bract	lanceolate, yellowish green acute/aciculate apices	linear, acute dark pink/red apices	oblanceolate, obtuse pale pink apices
Pappus bristles	shortly sparsely barbed at base	longly ciliate at base	longly ciliate at base

dark gray-green, densely villous to lanate (pubescence ca. 5 mm long), margins limbate, entire. *Capitula* crateriform, solitary on flowering stem, heterogamous, radiate, full diameter 1.4–2.7(3.0) cm, disk diameter (0.4)0.9–1.5 cm, 5 to 7 per plant; *involucral bracts* in a continuous series distinguished into 3 types: outer involucral bracts as cauline leaves, 8.5–11.5 × 2.0–5.5 mm, densely white villous on laminar surfaces and on lower abaxial membranous margins, ratio of lamina to membranous margin decreases along involucral bract progression; middle involucral bract series elliptic, obtuse, lamina component much reduced and margins nearly to entirely membranous, 9–10.5 × 4–5 mm, abaxial pubescence short, sericeous, white; inner involucral bract series oblanceolate to obtuse, hyaline, ca. 13 × 3–4 mm, nearly glabrous, tinged pale pink at apices. *Ray florets* bilabiate, yellow, single series, (9)16 to 23, pistillate anthers reduced to inconspicuous staminodes, 14–15 mm long, tube 6.5 mm long; ligule 2.6 mm wide, shortly 3-dentate, abaxially sericeous, inner lip 4 mm long, bifid, acute; *disk florets* tubular, yellow, ca. 120, hermaphroditic anthers fertile, corollas 9.5 mm long, tube 8 mm long, glabrous; *styles* (ray and disk) 10 mm long, stigma lobes linear, 0.4 mm long. *Achenes* (ray and disk) turbinate, 2.5–3.5 mm long, papillose; *pappus* white, 10 mm long, ciliate below, increasingly densely scabrid to apex, in 1 to 2 series.

Most measurements were made on herbarium material. Field measurements made by M. Kalin Arroyo and I. Till-Bottraud from the "Mil Cuevas" population (collection number 25076) had much lower ray counts (≤ 16 per capitulum) and more variably sized capitula. The reduced size of populations of this species was also observed in 2004 (M. Kalin Arroyo, pers. comm.), reportedly a much drier year. These variation extremes are represented by the parenthetical values in the description. Such breadth of morphological variation is not unusual in the annual species of *Chaetanthera*. Populations of these annual species may vary in size from year to year and also with changing altitude and latitude, such variation possibly caused by differences in availability of water. From a species perspective, this can result in the emergence of trends in morphology that are not taxonomically valuable.

Distribution and habitat. This species is distributed in the upper Elqui valley in the Cordillera de Doña Ana (Río La Laguna–Río Turbio–Río Elqui) and the Sierra de Tatul del Medio (Río del Carmen–Río Huasco) in Chile. Individuals grow scattered among screes and talus, and in deep sandy soils off screes at altitudes between 2300 and 3100 m.

Phenology. These annual plants flower and fruit in December and January.

Etymology. The specific epithet "kalinae" honors Mary T. Kalin Arroyo, an active botanist and ecologist in Chile, who has an ongoing scientific interest in *Chaetanthera* and who has contributed significantly to the collection and understanding of the genus.

The annual decumbent habit, floral morphology, basally ciliate pappus bristles, and turbinate, papillose achenes of *Chaetanthera kalinae* place it definitively in *Chaetanthera* subg. *Tylloma*. The entire limbate leaf margin indicates it is most closely related to taxa within the *C. limbata–C. glabrata* complex. Historically, this complex was first studied in detail by Reiche (1905) as part of his floristic work of Chile. He recognized that the taxa within *Tylloma* were highly polymorphic, so much so that he felt compelled to subdivide *C. glabrata* into six varieties and retained two further taxa (*Tylloma ciliatum* Philippi and *Tylloma limbatum* D. Don) based principally on the indumentum types. Cabrera (1937) dealt with this complex by reducing the annual *Tylloma* taxa with entire lamina margins to two species: *C. glabrata*, including everything that was glabrous, and *C. limbata*, including all plants with variably glabrous to lanuginous stems and leaves. While this concept allowed the natural segregation of the glabrous from the pubescent, it supported two entities with highly polymorphic leaf shape, leaf size, and involucral bract shape. Current revision work has shown that indumentum type plays a significant role in delimiting natural taxa in this group, while the polymorphic characters mentioned above are not taxonomically valuable. Seven taxa can be recognized, of which *C. kalinae* is one of two new to science. *Chaetanthera limbata* is principally distinguished from *C. kalinae* by typically only having long filamentous hairs tufted in the axils, although according to the protologue the young leaves may have woolly surfaces ("Folia...juniora praecipue supra lanigera" Don (1830: 238)). The leaves also have black sessile to pedicellate glandular trichomes on the lamina and margins. The leaf lamina is orbicular to elongate-cordate instead of orbicular-reniform, and the inner involucral bracts are linear with acute pink-red apices. *Chaetanthera kalinae* can be distinguished from other similar species by its unique combination of broadly spathulate, orbicular-reniform, densely lanate leaves and outer phyllaries, the broadly oblanceolate, inner series of phyllaries with obtuse pale pink tips, and yellow rays. It may be possible to confuse this annual with younger or poorly pressed forms of the perennial *C. lanata* (Philippi) I. M. Johnston. *Chaetanthera lanata* is distinguished from *C. kalinae* primarily by its perennial life form with tough, lignified roots and spreading cushion habit, having white rays with a red dorsal stripe and pappus bristles that are shortly sparsely barbed at the base. *Chaetanthera lanata* is further differentiated from *C. limbata* by having lanceolate inner involucral bracts with yellowish green acute or aciculate apices. Table 1 lays out the characters that define the three morphologically similar species *C. kalinae*, *C. limbata*, and *C. lanata*.

Not all the characters referred to in Table 1 are always represented on herbarium sheets, especially on older collections, hence the potential for confusion. The species are absolutely distinct in the field.

The Cordillera de Doña Ana is a *locus classicus* for several *Chaetanthera* taxa, particularly those based on material collected by Claudio Gay in the 1830s and described by Remy in Gay's (1848) *Flora de Chile*. However, it is interesting to have novel collections from this area that was previously so intensively botanized. Other taxa have also recently been collected and described from this area (e.g., *Calceolaria flavovirens* C. Ehrhart, 2000).

The publication of this new species does not affect the most recent key to the *Chaetanthera* species published by Katinas (1996) for the Argentinian taxa because *C. kalinae* appears to be very localized in the regions of Coquimbo and Atacama in Chile. A new record of *C. limbata* aff. for San Juan, Argentina (Tombesi, 2000), has been confirmed to be a yellow-flowered perennial specimen (*Kiesling, Ulibarri & Krapovickas 7504*, SI image), which is clearly not *C. kalinae* and would appear to be much closer to *C. lanata*.

Paratypes. CHILE. **III Región de Atacama:** Prov. de Huasco camino entre San Felix y Miña Pascua Lama, sect. El Nevado, *M. T. Kalin Arroyo & Till-Bottraud 25090* (CONC). **IV Región de Coquimbo:** Prov. de Elqui curva 9, sector "Mil Cuevas" camino entre Guanta y Baños del Toro *M. T. Kalin Arroyo & Till-Bottraud 25076* (CONC); Rodados Río Seco, 3 km E of Nueva Elqui, *R. Wagenknecht 18117* (G, GH); Weg von Las Juntas im Elqui–Tal zu den Baños del Toro, *F. Hellwig 1671* (G); Straße von Vicuña zum Embalse La Laguna km 112, Flußbett–Schotter, *C. Ehrhart & E. Sonderegger 96/1056* (MSB).

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